Math 3C Fall 2014
Pre-lecture 5-1 Due: Beginning of lecture-Monday, November 3.

This is to be done on your own paper. Please write your name (last name first) on the top right corner along with your discussion section number (B02, B03 etc) and "pre-lecture [number]" (in this case "pre-lecture 5-1").

This will be graded on effort and thoughtfulness, not on correctness. With that said, do not feel obligated to write more than necessary. This is intended for you to work on your own.

1. Draw a coordinate plane going from -8 to 8 on both axes. On this coordinate plane, with the help of a calculator or by plotting some points:

   (a) Draw the graph of the function $f(x) = 2^x$.

      i. What is the domain of $f(x)$?

      ii. What is the range of $f(x)$?

   (b) Now draw the graph of the inverse, i.e. draw the graph of $f^{-1}(x)$. (sometimes we write $f^{-1}(y)$ but since we want to draw the graph with the independent variable on the $x-$axis, we write $f^{-1}(x)$ instead)

      i. What is the domain of $f^{-1}(x)$?

      ii. What is the range of $f^{-1}(x)$?

2. Referring to $f(x)$ and $f^{-1}(x)$ from Question 1, what is the value of $f^{-1}(1)$ (in other words, which x makes $1 = 2^x$ true)? How about $f^{-1}(2)$? and $f^{-1}(8)$?

3. By the definition of $f^{-1}(y)$ where $f(x) = 2^x$ we have that

$$y = 2^{f^{-1}(y)}.$$

   We'll refer to this as the "key equation". You will get 2 new equations in the next two steps:

   (a) Plug in the number a^b in place of y in the "key equation" to get "equation 1".

   (b) Plug in the number a in place of y in the "key equation" to get "equation 2"

   (c) Now take the bth root of both sides of "equation 1" to get a new equation, we'll call it "equation 3".

   (d) Now compare "equation 2" with "equation 3" (Hint: if you did this right, they should both be equal to the same thing). Now use an exponent rule and do some rearranging to figure out another way to write $f^{-1}\left(a^b\right)$.

4. Do you recognize this function $f^{-1}(x)$? It may be familiar from high school.